SECTION 20 05 23
MANUAL VALVES (REVISED AD-1)

PART 1 - GENERAL

1.1 DESCRIPTION

A. Definitions:
   1. Class: ANSI Class.
   2. SWP: Steam Working Pressure.
   3. WOG: Water/Oil/Gas non-shock working pressure.
   4. WWP: Cold water non-shock working pressure.

1.2 QUALITY ASSURANCE

A. This specification lists a variety of valves that may be applicable to the project. Not all valves listed are applicable to the project, refer to appropriate specs sections for project applicability.

B. Valves used in flammable liquid or flammable gas systems: UL listed for applicable service.

C. Valves cleaned for oxygen service: CGA Pamphlet G-4.1, Cleaning Equipment for Oxygen Service.

D. Valve bodies, shells and seats: Designed, manufactured, and tested in accordance with the following:
   1. Pressure testing of steel valves: MSS SP-61.
   2. Butterfly valves: MSS SP-67.
   3. Cast iron gate valves, flanged and threaded ends: MSS SP-70.
   4. Cast iron swing check valves, flanged and threaded ends: MSS SP-71.
   5. Cast iron plug valves, flanged and threaded ends: MSS SP-78.
   6. Bronze gate, globe, angle and check valves: MSS SP-80.
   7. Valve pressure testing methods: MSS SP-82.
   8. Cast iron globe and angle valves, flanged and threaded ends: MSS SP-85.
   9. Diaphragm type valves: MSS SP-88.
   10. Resilient seated eccentric cast iron plug valves: MSS SP-108.
   11. Ball valves--threaded, socket-welding, solder joint, grooved, and flared ends: MSS SP-110.

E. Standard Specification for Composition of Bronze or Ounce Metal Castings: ASTM-B62.

F. Standard Specification for Steam or Valve Bronze Castings: ASTM-B61.

G. Iron body valves:
   1. Pressure containing parts: ASTM-A126, Grade-B.
      a. Standard Specification for Gray Iron Castings for valves, flanges and pipe fittings: ASTM-A126, Grade B.
   2. Face to face and end to end dimensions: ANSI/ASME-B16.10.
   3. Use domestic manufactured valves as defined by Buy American Act.

H. Valve stems: ASTM-B371, Alloy C69400; ASTM-B371, Alloy C65100H04 (rolled silicon brass); or other material equally resistant to dezincification.

I. Indicate following information on valves:
   1. Stamped or cast into body:
      a. Manufacturer's name or trademark.
      b. Pressure rating as Class, SWP, WOG, or WWP.
      c. "UL-FM" for UL-FM valves.
   2. Permanently attached to body:

a. Valve's country of origin.

1.3 SUBMITTALS

A. Product data:
1. Valves.
a. In addition to submittal requirements of 01340, submittal shall include the following:
1) For submittals with model numbers not listed in this section, include published cross reference sheet. Indicate association between submitted model number and the listed model number on the cross reference sheet.
2) For each valve submitted indicate in which specification section(s) and in which system(s) the valve will be used.
b. When valve assembly includes components other than the base valve body and handle (e.g., operator, valve box), include data on entire valve assembly.

PART 2 - PRODUCTS

2.1 GENERAL

A. Acceptable manufacturers:
1. Angle valves:
a. Base:
1) Nibco.
2) Stockham .
b. Optional:
1) Crane Valves.
2) Hammond Valve.
3) Jenkins Valves.
4) Lunken.
5) Milwaukee Valve.
6) Powell.
7) Walworth.
2. Ball valves:
a. Base:
1) Milwaukee Valve.
2) Nibco.
b. Optional:
1) Apollo.
2) Crane Valves.
3) Hammond Valve.
4) Jamesbury.
5) Jenkins Valves.
6) Stockham.
3. Butterfly valves:
a. Base:
1) DeZurik.
2) Milwaukee Valve.
3) Stockham.
4) Victaulic of America.
b. Optional:
1) CenterLine Inds.
2) Crane Valves.
3) Jamesbury.
4) Hammond Valve.
5) Keystone Valve.

6) Lunken.
7) Mueller Steam Specialty.
8) Nibco.
9) Powell.
10) Walworth.

4. High Performance Butterfly Valves:
   a. Base:
      1) Dezurik.
   b. Optioinal:
      1) Bray Controls.
      2) Neles (Jamesbury).
5. Check valves:
   a. Base:
      1) Apco Valve & Primer.
      2) Nibco.
      3) Stockham Valves & Fittings.
   b. Optional:
      1) Crane Valves.
      2) Hammond Valve.
      3) Kennedy Valve.
      4) Milwaukee Valve.
      5) Mueller Steam Specialty.
      6) Powell.
      7) Victaulic of America.
      8) Viking.
      9) Walworth.
      10) Waterous.
6. Globe valves:
   a. Base:
      1) Stockham.
   b. Optional:
      1) Crane Valves.
      2) Hammond Valve.
      3) Jenkins Valves.
      4) Lunken.
      5) Milwaukee Valve.
      6) Nibco.
      7) Powell.
      8) Walworth.
7. Plug valves:
   a. Base:
      1) DeZurik.
      2) Resun Valves.
   b. Optional:
      1) Milliken.
      2) Mueller Steam Specialty.
      3) Rockwell International.
      4) Victaulic of America.
8. Valve boxes and stop boxes:
   a. Base:
      1) Tyler Pipe.
      2) Western.
   b. Optional:
      1) Neenah Foundry.
      2) Vulcan.

3) Local foundry.

9. Balancing valves (globe style):
   a. Base:
      1) Tour and Andersson.
   b. Optional:
      1) Armstrong.
      2) Wheatley.
      3) Mepco.

AD-1: Revised per Addenda 1.

B. Ball valves:
   1. Port size: Standard.
   2. Ball and stem material: 316 Stainless Steel unless noted otherwise in specific valve description.
   3. Blow-out proof stems.
   4. Reinforced Teflon (PTFE) (PTFE) seats.
   5. Teflon (PTFE) (PTFE) seals.
   6. Adjustable packing.
   7. 3-piece valves:
      a. May be standard port.
      b. Repairable in line.

C. Butterfly valves:
   1. Ninety degree operation.
   2. Bi-directional, bubble-tight shut off at full pressure rating (at full differential pressure).
   3. 2 IN extended neck.
   4. Lugs, where specified, shall be drilled and tapped.
   5. Operators:
      a. 2-1/2 to 4 IN: Position lock handle.
      b. 5 IN and larger: gear operator with 4-arm or wheel handle.
   6. Iron body:
      a. Seals shall be replaceable without removing valve from line or removing parts other than operator.
   7. Bronze:
      a. Blow-out proof stem.
      b. Viton seals.
      c. Pressure rating: 175 PSI WWP, 350 PSI WOG.

D. High performance butterfly valves:
   1. Ninety degree operation.
   2. Bi-directional, drip-tight shut off at full pressure rating.
   3. 2 IN extended neck.
   4. Lugs shall be drilled and tapped.
   5. Operator: gear type with 4-arm or wheel handle.
   6. Body: carbon steel.
   7. Disc: stainless steel.
   8. Seat: RTFE.
   9. Stem: stainless steel; blow-out proof.
   10. Taper pins: compression type; stainless steel.
   11. ANSI Class: 150.
   12. Applicable fire test standard: API-607.

E. Chain operators:
   1. Provide operators for valves located in mechanical spaces 8 FT or higher above floor.
   2. Chain lever or chain sprocket operator with sufficient chain to reach within 5 FT of floor.
   3. Remote operator accessories by same manufacturer as valve.

4. Do not provide for Fire Protection valves.

F. End styles, general:
   1. Compatible with piping systems served.
   2. Flanged valves:
      a. Class 125 cast iron: Flat flanges.
      b. Class 250 cast iron: Raised flanges.
      c. Ductile iron: Raised flanges.
   3. Valves with solder ends for use in brazed piping systems shall be constructed for brazing.

G. Extended necks and stems:
   1. For valves specified with extended necks or stems, provide design that isolates moving valve parts from insulation.
   2. For valves specified with extended necks or stems and memory stops, provide design that allows access to memory stop without disturbing insulation.

H. Packing shall not contain asbestos.

I. Plug valves:
   1. Eccentric plugs:
      a. Non-lubricated valves with resilient seats shall be suitable for 250 degF service.
      b. Rubber seated eccentric plugs: Bolted stem seals shall permit replacement of packing without removing valve from line or removing parts other than operator.

2.2 VALVES

A. General:
   1. Example model numbers may indicate a general series, or may be abbreviated. They may not reflect all features described. Provide valves with described features.
   2. Specified requirements are minimums. Valves that meet or exceed specifications may be submitted.

B. V-6: Globe valve, Class 150, bronze body, union bonnet, renewable Teflon (PTFE) disc, solder. Example: Stockham B-24T.

C. V-7: Globe valve, same as V-6 except threaded. Example: Stockham B-22T.

D. V-8: Globe valve, Class 125, cast iron body, bronze trim, bolted bonnet, OS&Y, renewable seat and bronze disc, flanged. Example: Stockham G-512.

E. V-9: Globe valve, Class 200, bronze body, union bonnet, renewable plug type seat and disc, threaded. Example: Stockham B-62.

F. V-10: Globe valve, same as V-8 except Class 250. Example: Stockham F-532.

G. V-11: Ball valve, 150 PSI SWP, 400 PSI WOG bronze body, adjustable memory stop, 3-piece construction, extended stem, solder. Example: Milwaukee BA-350S.

H. V-12: Ball valve, same as V-11 except threaded. Example: Milwaukee BA-300S.

I. V-13: Ball valve, 150 PSI SWP, 400 PSI WOG bronze body, 2-piece construction, extended stem, solder. Example: Milwaukee BA-150S.

J. V-14: Ball valve, same as V-13 except threaded. Example: Milwaukee BA-100S.

K. V-15: Ball valve, 150 PSI SWP, 400 PSI WOG, 29 IN Hg vacuum service, bronze body, 3-piece construction, chrome plated brass ball, cleaned and capped for oxygen service, lockable in either the open or closed position, color coded handle to match gas service, braze. Example: Milwaukee BA-350S.

L. V-16: Ball valve, 150 PSI SWP, 600 PSI WOG, 250 PSI UL listed for flammable liquids and LP gas, bronze body, 2-piece construction, full or standard port, bronze ball, non-lubricated, threaded. Example: Nibco T-580-70-UL & T-585-70-UL.

M. V-17: Angle valve, Class 125, bronze body, screwed bonnet, bronze disc, threaded. Example: Stockham B-216.

N. V-18: Angle valve, Class 125, cast iron body, bolted bonnet, bronze trim, renewable seat and disc, flanged. Example: Nibco F-818-B.

O. V-19: Angle valve, Class 200, bronze body, union bonnet, bronze disc, threaded. Example: Stockham B-237.

P. V-20: Angle valve, Class 250, cast iron body, bronze trim, flanged. Example: Stockham F-541.

Q. V-21: Angle valve, automatic stop-check, Class 250, cast iron body, bolted bonnet, renewable disc and seat, flanged. Example: Stockham F-541.

R. V-22: Check valve, in-line pattern, spring-operated double doors, Class 250, cast iron body, renewable bronze doors and Viton-A seal, Inconel springs, stainless steel trim, flat faced wafer. Example: Stockham WG-976.

S. V-23: Check valve, Y-pattern, horizontal swing, Class 150, bronze body, threaded cap, renewable Teflon (PTFE) disc and seat, threaded. Example: Nibco T-433-Y.

T. V-24: Check valve, Y-pattern, horizontal swing, Class 125, bronze body, threaded cap, renewable bronze disc and seat, solder. Example: Nibco S-413-B.

U. V-25: Check valve, same as V-23 except Class 125. Example: Nibco T-413-Y.

V. V-26: Check valve, in-line pattern, spring-operated disc, Class 125, bronze body, renewable Teflon (PTFE) disc and seat, 316 stainless-steel spring, threaded. Example: Nibco T-480-Y.

W. V-27: Check valve, T-pattern, horizontal lift, Class 150, bronze body, union bonnet, renewable Teflon (PTFE) disc and seat, threaded. Example: Stockham B-322-T.

X. V-28: Check valve, T-pattern, horizontal swing, Class 125, cast iron body, bolted bonnet, bronze trim, renewable bronze or cast iron disc and seat, flanged. Example: Stockham G-931.

Y. V-29: Check valve, in-line pattern, spring-operated double doors, Class 125 (cast iron body) or Class 150 (steel body), Buna-N or EPDM seal, aluminum bronze or stainless steel doors, 316 stainless steel spring; grooved, threaded, flanged, wafer, or lugged at locations other than equipment; grooved, flanged or lugged if between equipment and its isolation valve. Example: APCO L9000.

Z. V-30: Check valve, silent, in-line pattern, spring-operated disc, Class 125, cast iron body, renewable bronze disc and seat, stainless steel spring, flat faced wafer. Example: Nibco W-910-B.

AA. V-31: Check valve, same as V-23 except Class 200. Example: Nibco T-473-Y.

BB. V-32: Check valve, same as V-28 except Class 250. Example: Stockham F-947.

CC. V-33: Butterfly valve, 200 PSI WWP; 27 IN Hg vacuum; cast or ductile iron body; EPT (EPDM) sleeve; stainless steel stem; aluminum-bronze or stainless steel disc; lugged. Example: Stockham L#-7#2.

DD. V-34: Butterfly valve, same as V-33 except wafer. Example: Stockham L#-5#2.

EE. V-35: Butterfly valve, 200 PSI WWP for 12 IN and smaller, 175 PSI WWP for 14 IN and larger; 27 IN Hg vacuum for all sizes; cast or ductile iron body; EPT (EPDM) seat; stainless steel stem; replaceable forged brass, aluminum-bronze, stainless steel, or EPDM coated ductile iron disc; grooved. Example: Victaulic 300/709.

FF. V-36: Eccentric plug valve, 175 PSI WOG, cast-iron body, bronze or nickel-plated cast-iron plug, Isobutene-Isoprene steam and plug seals, high-temperature plug face, capped drip tap on seat end of valve, memory stop, lever handle, threaded. Example: DeZurik 499S.

GG. V-37: Eccentric plug valve, 175 PSI WWP for 12 IN and smaller, 150 PSI WWP for 14 IN and larger, cast-iron body, Viton filled TFE U-ring seal, Isobutene-Isoprene plug face, memory stop; lever handle for sizes 2-1/2 to 4 IN; gear operator with handwheel actuator for sizes 6 IN and larger; flanged. Example: DeZurik 118F.

HH. V-38: Eccentric plug valve, same as V-36 except flanged, or grooved. Example: DeZurik 499.

II. V-39: Ball valve, same as V-13 and V-14 except include adjustable memory stop. Example: Milwaukee BA-100S and BA-150S.

JJ. V-40: Butterfly valve, 200 PSI WWP, bronze body, adjustable memory stop with visual disc position range of 90 degrees, stainless steel disc and stem, Viton seal, threaded. Example: Milwaukee BB2-100.

KK. V-41: Plug valve, lubricated, 200 PSI WOG, semi-steel, bottom or bolted-top entry, UL listed for application, lubricant compatible with application, short pattern flanged. Example: Resun R-1431.

LL. V-42: Not used.

MM. V-47, Gate valve with valve box:

1. Gate valve, AWWA-C500, 200 PSI WWP for 12 IN and smaller, 150 PSI for 14 IN and larger, iron body, bronze mounted, bronze or cast-iron double disc, non-rising stem, parallel seat, mechanical joint. Example: Stockham G-743.
2. Valve box: coated cast-iron, 5-1/4 IN shaft, screw type, 3-piece, drop-in lid with cast-in marking indicating service. Example: Tyler 6860.

NN. V-48, Butterfly valve with valve box:

1. Butterfly valve, AWWA-C504, Class 150, iron body, stainless steel seat, aluminum-bronze or cast iron disc, natural rubber or Buna-N seat, mechanical joint or flanged. Example: DeZurik BAW.
2. Valve box: coated cast-iron, 5-1/4 IN shaft, screw type, 3-piece, drop-in lid with cast-in marking indicating service. Example: Tyler 6860.

OO. V-49: Gate valve, UL-FM, 175 PSI WWP, bronze body, union or screwed bonnet, solid wedge disc, OS&Y, threaded. Example: Nibco T-104-O.

PP. V-50: Gate valve, UL-FM, 175 PSI WWP, cast iron body, bolted bonnet, resilient or solid wedge, OS&Y, flanged. Example: Stockham G-634.

QQ. V-51: Butterfly valve, UL-FM, 175 PSI WWP, ductile iron body, O-Ring seals, aluminum-bronze or ductile-iron disc, stainless steel stem, Buna-N seal, manual geared operator with visual position indicator, lugged. Example: Stockham LD-72UF.

RR. V-52: Gate valve, UL-FM, AWWA C-509, 175 PSI WWP, cast iron body, resilient wedge, non-rise stem, indicator post flange, MJ or flanged. Example: Stockham G-600/601/602.

SS. V-53: Check valve, T-pattern, horizontal swing, UL-FM, 175 PSI WWP, cast iron body, bolted bonnet, bronze trim, renewable bronze or cast-iron disc and seat, flanged. Example: Stockham G-939.

TT. V-54: Check valve, in-line, spring-operated single or double door(s), UL-FM, 200 PSI WWP, cast iron body, renewable bronze door and rubber or EPDM seat, stainless steel spring, wafer or grooved. Example: Stockham WG-990.

UU. V-55: Butterfly valve, UL listed, 175 PSI WWP, bronze body, stainless steel stem and disc, Viton seal, threaded. Example: Milwaukee BB2-100.

VV. V-56: Butterfly valve, same as V-40 except include extended neck, solder. Example: Milwaukee BB2-350.

WW. V-57: Butterfly valve, same as V-40 except include extended neck, threaded. Example: Milwaukee BB2-100.

XX. V-58: Not used.

YY. V-59: Butterfly valve, same as V-55 with tamper switch. Example: Milwaukee BB2-100.

ZZ. V-60: Plug valve, lubricated, 125 PSI WOG semi-steel, bottom or bolted-top entry, UL listed for application, lubricant compatible with application, threaded. Example: Resun R-1430.

AAA. V-61: Butterfly valve, UL-FM, 175 PSI WWP, coated cast or ductile iron body, aluminum bronze or ductile iron disk with EPDM coating, manual geared operator with visual position indicator, grooved. Example: Victaulic 708.

BBB. V-62: Butterfly valve, 300 PSI WOG, 27 IN vacuum, bronze body, ductile iron disk with EPDM coating, extended neck, grooved. Example: Victaulic 600.

CCC. V-63: High performance butterfly valve, Class 150, carbon steel body, RTFE seat, stainless steel shaft, stainless steel disc, TFE packing, wafer. Example: Dezurik BHP.

DDD. V-64: Globe-style balancing valve, Y-pattern design, rated for 300 PSI WWP and 250 degF, cast copper alloy construction, dual pressure/temperature read-out ports, calibrated handwheel with minimum (4) 360 degree adjustment turns and hidden tamper-proof memory stop, threaded or sweat connections and suitable for positive shut-off. Example: Tour and Andersson STAD/STAS.

EEE. V-65: Globe style balancing valve, Y-pattern design, rated for 250 PSI WWP and 250 degF, cast iron body fitted with copper alloy components, dual pressure/temperature read-out ports, calibrated handwheel with minimum (5) 360 degree adjustment turns and hidden tamper-proof memory stop, Class 125 flanged or grooved connections, and suitable for positive shut-off. Example: Tour and Andersson STAF/STAG.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Refer to individual sections for specific valve installation requirements.

B. Keep valves clear of pull spaces.

C. Install valves in accessible locations for operation, removal, inspection, and repair of valves and equipment.

D. Install globe valves with stem in vertical upright to horizontal position.

E. Install butterfly valves with stem in horizontal position.

F. Install diaphragm valves to be self draining.

G. Support valves individually to relieve pipe stress and allow equipment removal.

H. Follow manufacturer's recommendation for disassembly of valves for end joining method employed.

I. Provide globe valve in bypass around control valves. Coordinate with Controls Contractor.

J. Provide shut off valve on each side of control valve. Coordinate with Controls Contractor.

END OF SECTION